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An introduction to the Nexus strategy

Kim Spence-Jones, managing director of SJ Research, explains the philosophy behind the Nexus project.

Why networks?

There can be only one justification for using a computer network in a school; it must improve the quality of the education offered to the pupils.

There is no doubt that a well-run computer network is a valuable asset in any organization. It allows users to share scarce resources such as printers and scanners and it makes it easy to provide a standardised user-interface at all workstations. Used properly, a campus-wide network can significantly reduce the system management overheads. Networks can make computers more usable, faster, more flexible and indeed more reliable. Most important of all, a network allows data to be shared by all users.

At SJ Research, we have been working on microcomputer networks for almost ten years. We have always believed in universal inter-connection, and over the last decade, our vision of the future of networking has steadily expanded. The ultimate aim of network development is becoming a reality; universal campus-wide networks, interconnected to form a nation-wide – and eventually an international – resource.

Already there are signs of this future. You can point to many schools which have made excellent use of the current generation of networks. For example, there are counties where all pupils have their own electronic mailbox. Such pupils regularly exchange messages with each other and with schools abroad.

The Nexus objectives

When the Archimedes computer was first announced, we realised that a whole new approach to networking was needed. We set out to produce a system which was

- **Easy to set up**
- **Easy to run**
- **Fast**
- **Easy to upgrade**

The Nexus strategy is the result.
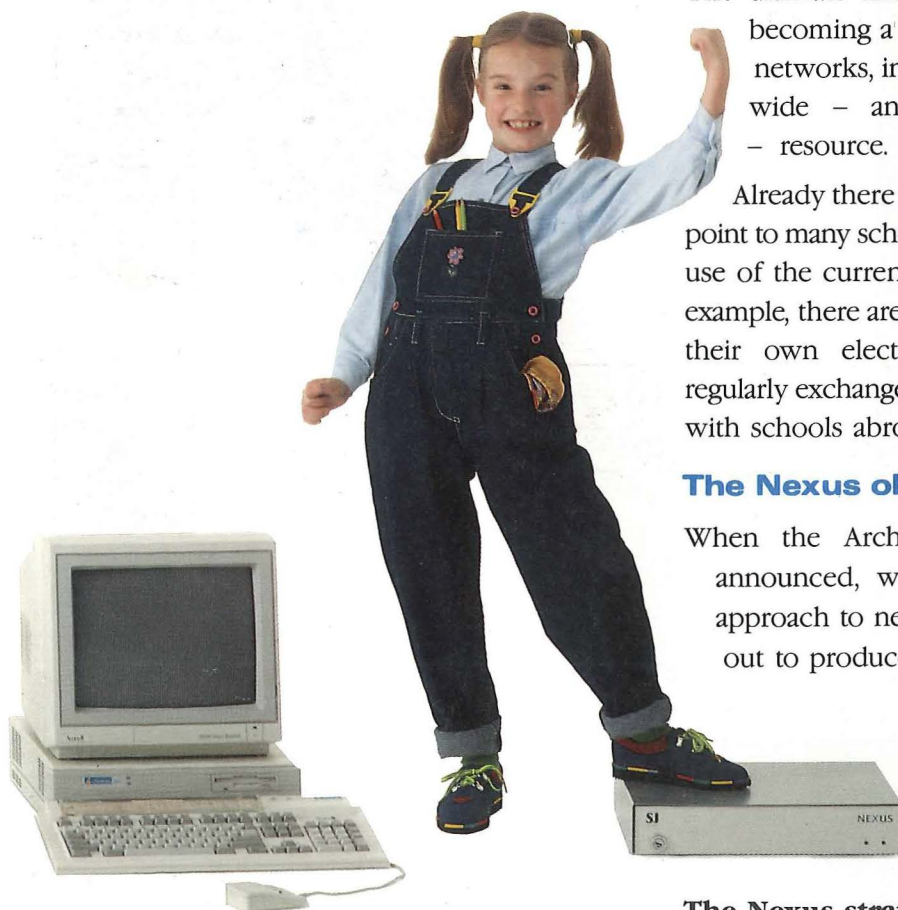
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Easy to set up

The introduction of Local Management of Schools has presented us all with a whole range of new challenges. Probably the biggest challenge for IT has been the reduction in centrally provided LEA support services. Hard-pressed IT teachers now have less help with the design and management of their systems.

Traditional networks have often been unnecessarily difficult to install and set up. This can be frustrating for the manager and users alike. More than ever we need systems which are "plug and go". We have put a lot of effort into simplifying the installation of both hardware and software.

On the hardware side, we offer two connecting systems. There is a "flying-lead" option which makes connecting to a Nexus disc sharer a matter of plugging in a lead to each station. There is also a permanent wiring system based on standard "mains"-sized socket-outlets. To make this option even easier, we have a number of installation toolkits available for hire, which come with a complete set of the tools required including a wiring tester.

The software set-up is easy to understand too. A Nexus shared disc is exactly like a write-protectable hard disc. If you know how to create a copy of your application on a write-protected floppy disc you can install software on the Nexus disc.
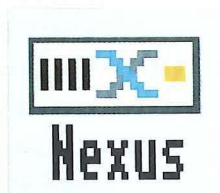
Easy to run

On the hardware side, Nexus wiring is all point-to-point. If a wiring fault does develop it will only affect a single station or small cluster. Not only does this allow the cause of the problem to be rapidly located, but in the meantime the rest of the network will continue to operate. This takes the pressure off the network manager; it is relatively easy to survive for a few hours with one or two stations out of action. Contrast this with a conventional bus network where a wiring fault can disable large sections of the network.

When we first introduced Nexus networking, we decided to concentrate on the shared disc, because this is the easiest to run and addressed the most pressing need; high speed loading for Applications, Fonts, etc. Shared access to printers soon followed. As the Nexus system develops new services will be added. The next stage will be to access file servers via Nexus wiring.

The Nexus disc sharer is simplicity itself to run. Because the main drive partition is write-protected it cannot be altered or corrupted by normal use. Once you have set up the system to work, it will remain set up.
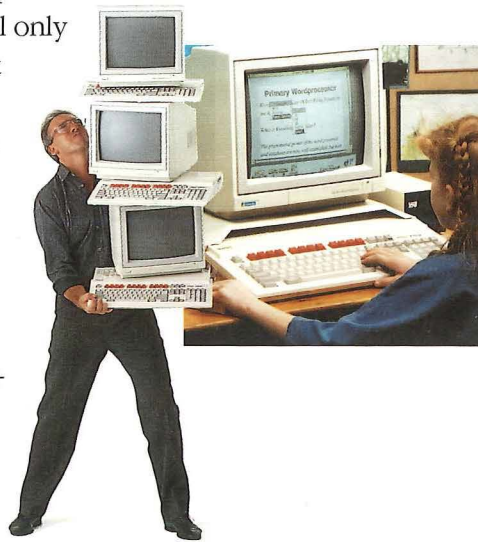
System components

The components of the disc sharer are as follows:

1. **A disc server with a choice of disc sizes.**

2. **Routers allow easy attachment of remote Archimedes sub-clusters.**

3. **Archimedes computer with Nexus interface card.**

4. **Socket boxes.**

5. **Cable.**

6. **Drop leads.**

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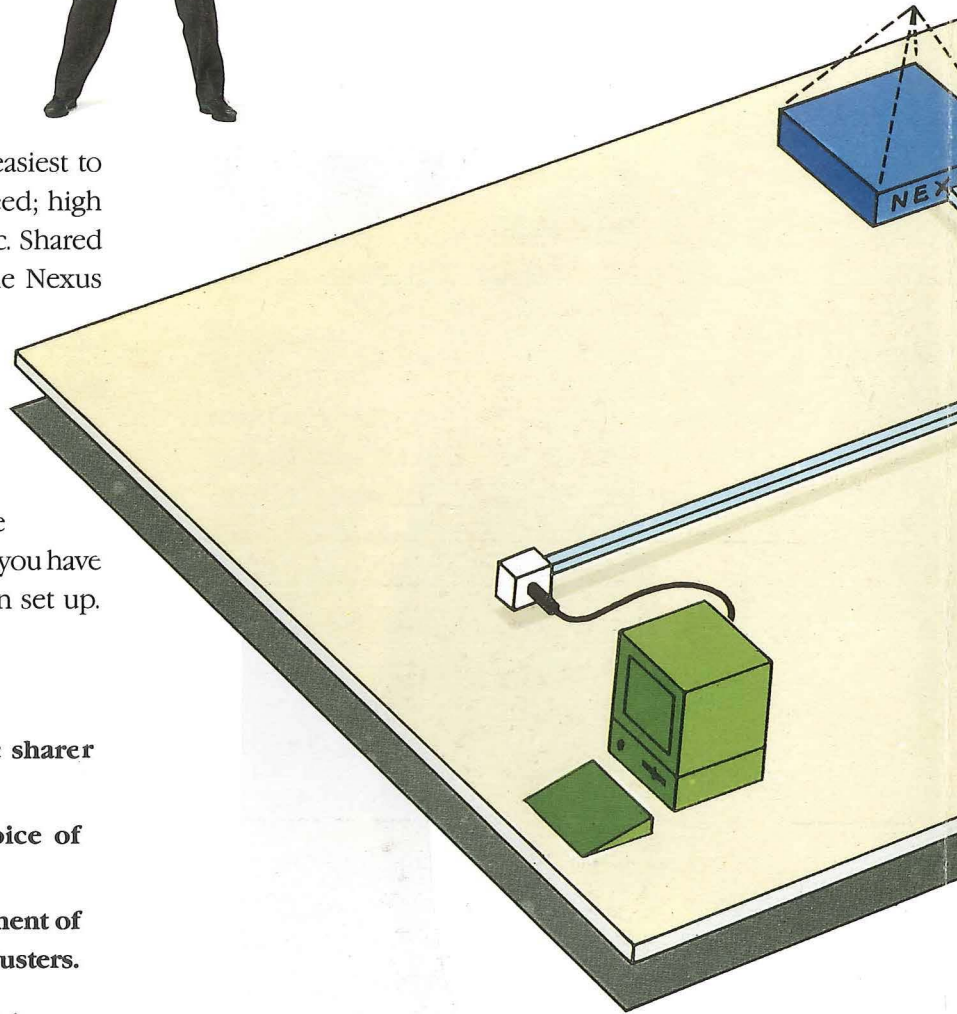
Fast

The current generation of hardware runs at 20 megabits per second; roughly a hundred times faster than typical Econet networks. Of course not all this capacity can be utilised by one station, any more than it can be on an Econet network. However, Nexus networks have a very significant performance advantage over other systems;
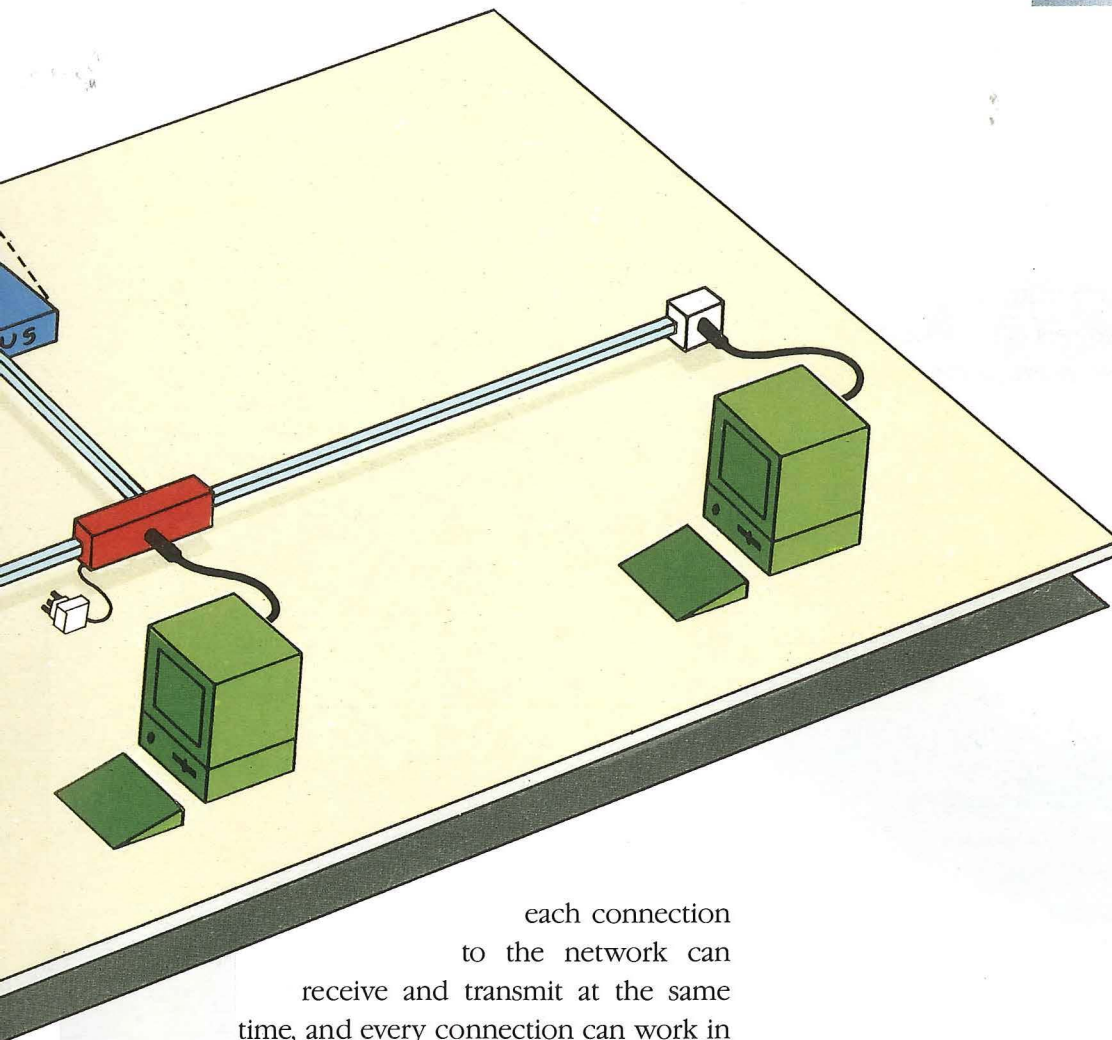
each connection to the network can receive and transmit at the same time, and every connection can work in parallel with the others in the network. The raw bandwidth of a disc server with four connections can thus be up to 160 Megabits per second! Again, protocol overheads and other considerations mean that in practice one sees much less than this – typically one or two megabits per second to each station, limited more by the disc accesses than anything else. Undoubtedly advances in technology will allow us to build faster servers to upgrade existing networks as time goes on.

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Easy to upgrade

The Nexus philosophy encompasses a smooth increase in performance from the situation today where the majority of micros are connected to an Econet network – or have only a floppy disc – towards a future where many stations will be connected directly to networks running at hundreds of megabits per second.

Here is the kind of set up we expect to be providing to schools over the next few years:

Today

■ Clusters of 12 workstations attached to Nexus disc servers for loading applications and storing scrap files.

■ User data on Econet file servers or floppy discs.

■ Isolated workstations with local hard disc, or floppy discs or Econet.

Later in 1992

■ Introduction of high-speed Econet protocols over Nexus clusters, with the option of "bridges" to a real Econet network. This will allow a Nexus-only network using a Level 4™ file server, or integration with an existing Econet/MDFS network.

■ Interconnection of Nexus clusters to form a larger Nexus network, using Nexus links running at ten or twenty megabits.

■ Nexus shared discs still used. They are easier to manage and normally give higher performance than the more complex file server protocol.

■ Full interconnectivity with Acorn network systems. To such a set-up, a Nexus network will be almost indistinguishable from an Econet network, although much faster. This means that you will be able to design a system with any appropriate combination of Econet, Ethernet and Nexus networking.
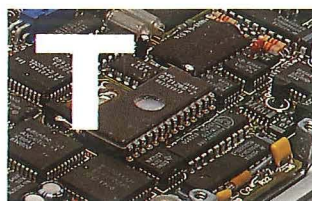
1993 (future trends...)

■ Appearance of the first applications to use the guaranteed bandwidth available through Nexus networks.

■ Maybe some experimental hundred-megabit backbone networks, depending on what technology is available by then, and at what price.

■ Maybe some new generations of file server – possibly new Econet-like servers, possibly Unix-based dedicated servers, maybe something completely new.

1994/5
(...and here we start to guess a bit!)

■ Campus-wide hundred-megabit backbone, with massive file servers, database servers and so on.

■ Optical fibre metropolitan area network ("MAN") or digital telephone ("ISDN") connection to County Hall and/or to national data services.

It remains to be seen exactly how accurate these predictions will prove to be. Whatever the future may hold, the Nexus system is already a fast, reliable, simple and cost-effective network and provides an excellent foundation on which to build your school's IT system.

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